

1. An inductive element for an ICP source comprising;
a conductor formed of a sheet of electrically conductive material formed into
at least one loop having shaped edges defining a plurality of segments
including segments from each of a plurality of differing geometries.
- 5 2. The inductive element of claim 1 wherein:
the shaped edges of the conductor are configured to segments of alternating
geometries around an axis of the element and a current path at
alternating radii around the axis.
- 10 3. The inductive element of claim 1 wherein:
the segments each having a thickness and a width defining an aspect ratio
of width to thickness;
a segment of one geometry having an aspect ratio that is relatively high with
respect to a segment of another geometry.
- 15 4. The inductive element of claim 1 wherein:
the conductor is formed of a sheet of highly electrically-conductive material;
the segments each having approximately the same thickness and being of at
least two different widths defining different aspect ratios of width to
thickness;
a segment of one geometry having an aspect ratio that is relatively high with
20 respect to a segment of another geometry.
5. The inductive element of claim 1 wherein:
the conductor has a plurality of cutouts therein defining a series of the
segments forming a current carrying path.
- 25 6. The inductive element of claim 5 wherein:
the conductor has a plurality of gaps therein, each interrupting a shorter one
of current paths around one of the cutouts.

7. The inductive element of claim 5 wherein:

the conductor is an annular sheet split along a radius thereof at one point on its circumference, providing ends of the conductor for connection across an RF power source.

8. The inductive element of claim 7 wherein:

the conductor has a shape selected from the group consisting of generally planar, generally cylindrical, generally spherical, and generally conical.

9. The inductive element of claim 1 wherein:

the conductor is formed of a sheet of highly electrically-conductive material;

the segments each having a thickness and a width defining an aspect ratio of width to thickness;

a segment of one geometry having an aspect ratio that is relatively high with respect to a segment of another geometry;

the conductor has a plurality of cutouts therein defining a series of the segments of different aspect ratios forming a current carrying path.

10. The inductive element of claim 9 wherein:

the cutouts are arranged in one or more circles.

11. The inductive element of claim 9 wherein:

the cutouts are spaced around one or more circles at approximately equally circumferentially spaced intervals.

12. An ICP source comprising the inductive element of claim 1 and further comprising:

the inductive element being outside of the chamber and generally congruent to the dielectric wall and having a width and a longitudinal extent generally parallel to the dielectric wall and having a thickness generally perpendicular to the dielectric wall.

13. An ICP apparatus comprising the inductive element of claim 1 and further comprising:

a vacuum processing chamber having a dielectric wall; and

the inductive element being outside of the chamber and generally congruent

5 to the dielectric wall and having a width and a longitudinal extent generally parallel to the dielectric wall and having a thickness generally perpendicular to the dielectric wall.

14. An ICP apparatus comprising:

a vacuum processing chamber having a dielectric wall;

an inductive element outside of the chamber and generally congruent to the dielectric wall and having a width and a longitudinal extent generally parallel to the dielectric wall and having a thickness generally perpendicular to the dielectric wall;

the inductive element being formed of a sheet of electrically-conductive material having a series of segments of differing aspect ratios;

an RF generator; and

a matching network connected between the inductive element and the RF generator.

15. A method of inductively coupling energy into a plasma of a processing apparatus, the method comprising:

providing an inductive element outside of the chamber and generally congruent with a dielectric wall of the chamber;

5 energizing the inductive element with an RF generator matched to the element; and

spatially distributing the plasma around an axis of the chamber with alternating segments of the element having differing geometries defined by shaped edges of the conductor.

10 **16.** The method claim **15** wherein:

the spatially distributing the plasma includes inductively coupling energy from lower cross-section segments of the element into a segmented ring of plasma density concentrations distributed around an axis of the chamber.

17. The method claim **15** wherein:

15 the spatially distributing the plasma includes inductively coupling energy from lower cross-section segments of the element in a plurality of rings having different radii from an axis of the chamber.

18. The method claim **15** wherein:

20 the element has a width and a longitudinal extent generally parallel to the dielectric wall and having a thickness generally perpendicular to the dielectric wall; and

the inductive element is formed of a sheet of electrically-conductive material having a series of segments of differing aspect ratios.

19. The method claim **15** wherein:

the spatially distributing the plasma includes affecting the path of the current
in the inductive element formed of a sheet material by an array of cutouts
in the material defining higher and lower cross-section segments of the
5 element and the radii of the segments from an axis of the chamber.

20. The method claim **15** further comprising:

shaping the edges of the inductive element to form a current path in the
element having a plurality of oscillations around an axis of the chamber.